On page 20, replace the first full paragraph with the following:

--Other drive mechanisms can also be used to transmit forces to linear axis member and receive positional information from member 40 along axis C. For example, a drive wheel made of a rubber-like material or other frictional material can be positioned on shaft 98 to contact linear axis member 40 along the edge of the wheel. The wheel can cause forces along member 40 from the friction between wheel and linear axis member. Such a drive wheel mechanism is disclosed in the abovementioned Application Serial No. 08/275,120 now Patent No. 5,623,582 as well as in U.S. Patent Application Serial No. 08/344,148, filed November 23, 1994 and entitled "Method and Apparatus for Providing Mechanical I/O for Computer Systems Interfaced with Elongated Flexible Objects" assigned to the assignee of the present invention and incorporated herein by reference in its entirety. Linear axis member 40 can also be a single shaft in alternate embodiments instead of a dual part sleeve and shaft.--

On pages 22 and 23, replace the bridging paragraph with:

-- Figure 9 is a schematic view of a computer 16 and an interface circuit 120 used in interface 14 to send and receive signals from mechanical apparatus 25. Circuit 120 includes computer 16, interface card 120, DAC 122, power amplifier circuit 124, digital sensors 128, and sensor interface 130. Optionally included are analog sensors 132 instead of or in addition to digital sensors 128, and ADC 134. In this embodiment, the interface 14 between computer 16 and mechanical apparatus 25 as shown in Figure 1 can be considered functionally equivalent to the interface circuits enclosed within the dashed line in Figure 14. Other types of interfaces 14 can also be used. For example, an electronic interface 14 is described in U.S. Patent Application Serial No. 08/092,974, filed July 16, 1993 and entitled "3-D Mechanical Mouse" assigned to the assignee of the present invention, which is the parent of file wrapper continuation application Serial No. 08/461,170, now U.S. Patent No. 5,576,727, and incorporated herein by reference in its entirety. The electronic interface described therein was designed for the Immersion PROBE™ 3-D mechanical mouse and has six channels corresponding to the six degrees of freedom of the Immersion PROBE.--

In the claims:

The following is a complete listing of a clean version of the presently pending claims (note that all claims have been reproduced for the Examiner's convenience; claims amended and added hereby are so indicated by the parenthetical expressions "amended" and "new", respectively):

Sub C1

44. (new) An apparatus for interfacing a user with a computer providing a laparoscopic surgical simulation, the apparatus comprising:

a user object comprising a handle and an elongated member;

a gimbal mechanism receiving the user object and allowing the user object to be manipulated in first, second and third rotary degrees of freedom and in a first translational degree of freedom, the gimbal mechanism comprising a five member linkage to provide the first and second rotary degrees of freedom; and

a sensing system coupled to the gimbal mechanism to detect manipulation of the user object in the first, second, and third rotational degrees of freedom and in the first translational degree of freedom;

whereby the sensing system provides input to the computer to control the laparoscopic surgical simulation.

Sub D1

45. (new) An apparatus according to claim 44 further comprising a handle sensor coupled to the handle to detect manipulation of at least a portion of the handle.

46. (new) An apparatus according to claim 44 wherein the handle comprises relatively pivotable portions.

47. (new) An apparatus according to claim 46 further comprising a sensor coupled to the handle to detect relative motion of the pivotable portions.

48. (new) An apparatus according to claim 44 wherein the handle comprises a finger wheel.

49. (new) An apparatus according to claim 44 further comprising a barrier between the handle and the gimbal mechanism.

50. (new) An apparatus according to claim 44 further comprising a trocar between the handle and the gimbal mechanism.

51. (new) An apparatus for interfacing a user with a computer providing a laparoscopic surgical simulation, the apparatus comprising:

a user object comprising a handle and an elongated member;

a gimbal mechanism receiving the user object and allowing the user object to be manipulated in first, second and third rotary degrees of freedom and in a first translational degree of freedom, the gimbal mechanism comprising a five member linkage to provide the first and second rotary degrees of freedom;

a sensing system coupled to the gimbal mechanism to detect manipulation of the user object in the first, second, and third rotational degrees of freedom and in the first translational degree of freedom; and

an actuator coupled to the gimbal mechanism to output a force to the user in one or more of the degrees of freedom;

whereby the sensing system provides input to the computer to control the laparoscopic surgical simulation and the actuator outputs one or more forces associated with the simulation.

52. (new) An apparatus according to claim 51 wherein the actuator comprises a motor.

53. (new) An apparatus according to claim 51 wherein the actuator comprises a braking mechanism.

54. (new) An apparatus according to claim 51 further comprising additional actuators so that forces may be output in each of the first, second, and third rotational degrees of freedom and in the first translational degree of freedom.

55. (new) An apparatus according to claim 51 further comprising a barrier between the handle and the gimbal mechanism.

56. (new) An apparatus according to claim 51 further comprising a trocar between the handle and the gimbal mechanism.

57. (new) An apparatus for interfacing a user with a computer providing a laparoscopic surgical simulation, the apparatus comprising:

a user object comprising a handle and an elongated member;

a gimbal mechanism receiving the user object and allowing the user object to be manipulated in first, second and third rotary degrees of freedom and in a first translational degree of freedom;

a sensing system coupled to the gimbal mechanism to detect manipulation of the user object in the first, second, and third rotational degrees of freedom and in the first translational degree of freedom; and

an actuator coupled to the gimbal mechanism through a cable and pulley to output a force to the user in one or more of the degrees of freedom;

whereby the sensing system provides input to the computer to control the laparoscopic surgical simulation and the actuator outputs one or more forces associated with the simulation.

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58. (new) An apparatus according to claim ~~57~~ wherein the actuator is coupled to the gimbal mechanism through the cable and pulley to provide a force to the user in the first translational degree of freedom.

59. (new) An apparatus according to claim 57 wherein the gimbal mechanism comprises a five member linkage to provide the first and second rotary degrees of freedom.

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60. (new) An apparatus according to claim ~~59~~ wherein the actuator is coupled to the five member linkage through the cable and pulley to provide a force to the user in the first or second rotary degrees of freedom.

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61. (new) An apparatus according to claim ~~60~~ further comprising a second actuator coupled to the five member linkage through another cable and pulley to provide a force to the user in the first or second rotary degrees of freedom.

62. (new) An apparatus according to claim 57 wherein the cable transmits a force from the pulley to a capstan drum, the capstan drum being coupled to the gimbal.